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The Results of a Survey to Determine the Cost of Producing Beef in California

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INTRODUCTION

A century and a half of activities centering in the production of beef in California have seen recorded many changes in methods of handling cattle, in breeds, and in details of business and organization. The cattle of Mission days, slender-legged, sharp-nosed, dun or brindle colored, light of weight, deer-like animals of restless, uneasy, suspicious temperament, fleet of foot, lean and tough of carcass, have given way before the introduction of better breeds and better blood-lines; the free, open, untilled ranges of pioneer times have succumbed in the advancement of more intensive farming; the independent selling by individuals, operating each in his own way, has been replaced by corporation and coöperative methods.

A business as it grows and expands tends to develop new problems, and must make readjustments to keep pace with the times. This is constantly true of agriculture in general and of the beef producing business in particular.

Today more attention is being paid to the business phases of beef production, and data concerning the financial side of the business are now being sought by those interested in the production, preparation, sale, and consumption of beef.

In a belief that more complete knowledge of costs of production is vital as a starting point in gaining a better understanding of the business, for use in organizing, reorganizing and administering a business involving over 1,400,000 head of cattle, worth more than \$48,000,000,* members of the California Cattlemen's Association asked the College of Agriculture to conduct a study into the costs of producing beef animals under California conditions. As a result of this request, data were collected in detail from typical California cattle ranges and ranches to provide a basis for: (1) Presenting actual

* See p. 26, "California Crop Report, 1923." Special Publication No. 43 of State of California Department of Agriculture.

figures of costs of production; (2) calculating unit cost factors involved in common methods of producing beef, and (3) making suggestions that may help individual cattlemen to obtain greater profits.

Data were obtained from a gross acreage of 484,283 acres of range, utilized by 15,431 stock cows, 833 bulls, 10,703 calves, 10,007 yearlings, 9850 2-year-olds, 1651 3-year-olds, a total of 32,211 head raised either for sale or for retention as breeding stock.

Records, complete enough for tabulating, were obtained from thirty-two ranches located in seventeen counties as follows:

County	No. of cattle ranches	County	No. of cattle ranches
San Benito	5	Butte	1
San Luis Obispo	2	Tehama	3
Santa Barbara	4	Shasta	3
Ventura	1	Trinity	1
Los Angeles	2	Siskiyou	2
Tulare	1	Modoc	1
Fresno	1	Humboldt	2
Madera	1	Mendocino	1
Yuba	1		

This list includes a total of 14 ranges located generally in the southern coast district, two in the northern coast district, eleven in the central valleys, and five in the mountain counties. For purposes of comparison cattle were classified into four groups, each group covering the calendar year from January 1 to December 31. Group No. 1 covered the year in which the calves were born, up to and including December 31. The average age of the calves therefore depended on the time the majority were dropped. If calving occurred in February and March the average age was taken as 10 months; if in April or May, the average age was taken as 8 months. Charges for stock cattle were carried jointly with the calves for the year in which the calves were dropped. Group No. 2, made up of yearlings, covered the second calendar year of the youngster's life, and similarly Group No. 3, consisting of two-year-olds, covered the third calendar year, Group No. 4, composed of three-year-olds, covered any portion of the fourth calendar year for such beef cattle as were carried for more than three years. In collecting data, all cattle purchased for fattening were omitted, attention being confined only to the breeding and rearing of ordinary market cattle under commercial conditions. Purebred cattle raised for sale as breeding stock were not included.

In estimating charges, whenever interest had to be included, a rate of 6 per cent was used. Taxes and insurance were for the actual sums paid.

The inquiry included a description of the ranch under study, its location, shape, acreage, physical condition, equipment, and climatic environment, data concerning methods of handling and costs—of breeding, feeding, rearing, and marketing. Calculation of investment in actual buildings, improvements and equipment was made a part of the study, in addition to a record of all labor costs (human, horse and mechanical), all general expenses, depreciation of equipment, interest on operating capital, and credits. Information was also obtained covering costs of marketing, prices obtained, and cattlemen's suggestions as to possible improvements.

Four rather distinct methods of raising cattle were practiced by the operators of these thirty-two ranches. A classification is made according to these methods:

Class I (Records 1–15) consists of grass fat cattle, raised exclusively under range conditions, on home ranges, occasionally supplemented with summer ranges. These records included ranges under all conditions, e.g., southern coast, central valley, and mountain.

Class II (Records 16–21) consists of cattle fed a small amount of supplementary feeds during periods when the range was short, though generally marketed as grass fat cattle. Such records were obtained from Shasta, Mendocino, San Luis Obispo, and Tehama counties.

Class III (Records 22–27) differs from the two preceding classes in that the cattle were generally fed hay, at from $\frac{1}{2}$ to $1\frac{1}{2}$ tons per head, during the cold weather in addition to summer range and some winter range feed. These records were collected in Siskiyou, Modoc, Yuba, and Humboldt counties.

Class IV (Records 28–32) consists of cattle fattened for market on various supplementary feeds, such as hay, beet tops, alfalfa, barley and corn. Records for this group are from Butte and Santa Barbara counties.

In assembling the data, costs calculated at the end of the first year of the calf's career included the following:

(1) A herd charge, made up of interest on average investment in stock cattle, depreciation, mortality, taxes and insurance.

(2) A similar charge was determined for the use of corrals and of equipment, and pro-rated according to amount of use by these calves and stock cattle.

(3) Operating costs were made up of labor—manual, management, horse, and use of truck and automobile; feeds, supplies, and miscellaneous expenses.

Man labor was recorded in hours of actual labor at the going wage, including the value of board and any other perquisites. Management

was determined by estimating the amount of time spent by the operator in purely managerial details, at the going salary scale for operating a similar business, or by prorating the actual rate paid if the operator received a salary.

To eliminate the necessity of becoming involved in land values, all feeds contributed by the ranch, whether pasture, hay, concentrates, or others, were charged at farm value, that is, at market price less costs of preparing for sale, delivering, and selling. Purchased feeds were figured at cost delivered to the ranch.

Capital invested in herds, ranch buildings, ranch equipment, and improvements in connection with corrals and stock quarters, such as fences, feed racks, water troughs, shelters, and flooring, was handled as an investment. Lands used for pasturage or for the production of feed were not included under investment, because productive land values are difficult to determine. Lands used for producing feed for the ranch were taken into account by a proper sum based on the going rate for pasture and the farm value for all hay, grain, or other feeds produced. No land investments were taken into account other than those in corrals, lanes, building sites, feed lots, and those occupied by stock water facilities. This method eliminated any danger of over-valuing lands, or inclusion of lands valued on a basis other than for strictly agricultural productive use. The value of the feeds produced, taken at farm prices, automatically determines *productive* land value.

The investment charge for lands in corrals, lanes, etc., was made up of the crop rental value for such lands. The reason for this is obvious. If lands regularly rent for \$2.50, \$3.00, or \$4.00 for agricultural purposes, yet have a market value of \$100 or \$150 per acre, interest at 6 per cent, if taken at the market value, would result in an inordinately high charge of \$6.00 to \$9.00, instead of the actual payments of less than half as much.

In the event that new investments were made during the year, such investments were taken into account in accordance with the length of time that they were in use during the period covered by this study, and pro-rated accordingly.

Interest was allowed upon the average investment in cattle, in buildings, in corral improvements and in ranch equipment. Interest was also charged upon sums of operating capital required to meet current expenses.

The herd investment was determined from the average number of cows and bulls maintained throughout the year at average values as shown by the first and second inventories. This figure therefore reflects any changes in values from such causes as fluctuating markets,

selling off of old cows, purchase of better stock, introduction of young animals into the breeding herd, or similar changes affecting the selling value of the herd.

The sum of these various charges plus a sum to cover interest on operating capital less any credits obtained gave the cost per head for the calendar year involved. Dividing by the weight per head indicated the cost per pound.

Costs for young cattle during their second year were made up of interest on investment in cattle of this group, taxes, insurance, and proper pro-rata of the charges for use of buildings, corrals and equipment, of operating costs, interest on operating capital, less credits. Cost for this second year was then added to the total as found for the first year.

For the third and subsequent years costs were similarly figured and added to the cost total already found.

Data were obtained by actual records taken from ranch books and from men's actual experiences and estimates. The data were taken for conditions representing as nearly as possible a cross section of the ordinary commercial practices in normal years, with a definite attempt made to eliminate exceptional conditions or unusual data.

OUTLINE OF THE STUDY AND FINDINGS

Costs of Producing California Beef.—On the basis of cattlemen's estimates and data collected during the period October 15, 1923, to February 1, 1924, the average cost of producing a calf to the end of the calendar year in which it was born amounted to \$38, or 8.8 cents per pound. On the same basis at the end of the second year, the youngster then being a short two-year-old, the cost amounted to \$56.31, or 7.7 cents per pound and at the end of the third calendar year to \$80.60 per head, or 7.6 cents per pound. For cattle carried beyond the third calendar year the cost rose to \$108.69, or 9 cents per pound. Considerable variations in costs occurred with the different ranches. These variations were traceable to a number of factors such as percentage of calf drop, mortality, average gains in weight per year, investment in equipment, labor expenditures, and estimated costs of management. For instance, the costs of producing calves to the end of the calendar year in which they were born varied from \$22.47 to \$58.70 for the different ranches, though \$38 was the average. On these thirty-two cattle ranches, four produced at a cost per head of less than \$30, twelve at from \$30 to \$40, eleven at from \$40 to \$50, and five faced costs in excess of \$50. The cost to the end of the second year averaging \$56.31 ranged from \$32.83 to \$88.04, with five ranches

producing at less than \$40, eleven at from \$40 to \$55, nine at from \$55 to \$70, while seven cost over \$70 per head. The costs to the end of the third year, averaging \$80.60, ranged from \$44.69 to \$118.88. Ten of these thirty-two ranches brought cattle to this stage at a cost per head below \$75. It cost \$75 to \$90 for eleven, and the eleven remaining had costs of over \$90 per head.

The following table gives the details for all thirty-two ranches with average costs both by the head and by the pound.

COST OF PRODUCING CALIFORNIA BEEF

Based on cattlemen's estimates and data collected October 15, 1923–February 1, 1924

Ranch number	Number of head of stock cows (to give idea of size)	Net cost per head				Net cost per pound			
		Calves, end of 1st year	Yearlings, end of 2nd year	Twos, end of 3rd year	Threes, or older	Calves, end of 1st year	Yearlings, end of 2nd year	Twos, end of 3rd year	Threes, or older
1.....	325	\$46.32	\$65.15	\$87.32	\$100.43	10.00c	8.68c	8.30c	8.35c
2.....	250	46.09	70.60	82.65	.....	8.40	8.30	8.30	.....
3.....	784	39.75	53.89	75.38	.....	9.90	8.30	6.85	.....
4.....	275	30.75	47.27	62.24	.....	6.80	6.75	5.65	.....
5.....	150	45.06	66.10	93.10	.....	8.19	8.81	8.46	.....
6.....	175	35.68	54.93	75.22	84.45	7.90	8.45	8.30	7.30
7.....	750	46.21	67.22	89.01	114.16	10.26	8.40	7.41	9.20
8.....	1,800	33.31	55.20	76.90	102.50	8.34	6.13	6.80	8.54
9.....	960	38.16	48.46	60.11	.....	7.20	5.80	5.70	.....
10.....	1,200	33.90	55.07	71.67	.....	6.78	6.90	6.00	.....
11.....	270	26.85	38.03	46.84	.....	5.96	5.85	5.02	.....
12.....	225	41.00	66.02	102.11	117.06	9.00	8.80	10.21	9.70
13.....	300	48.89	83.41	116.79	.....	10.80	11.00	9.70	.....
14.....	300	58.70	75.12	92.58	110.93	10.67	10.01	9.25	9.64
15.....	300	45.32	65.48	87.75	115.21	10.07	8.71	7.97	9.21
16.....	600	37.17	49.70	66.41	76.35	10.92	8.28	7.37	6.61
17.....	594	37.83	52.41	68.62	.....	8.00	6.60	6.50	.....
18.....	1,050	22.47	32.83	44.69	.....	5.60	5.10	4.70	.....
19.....	200	46.54	65.88	98.46	.....	11.63	9.41	9.84	.....
20.....	140	55.25	84.73	103.86	.....	11.05	12.10	10.38	.....
21.....	75	50.95	78.62	108.28	.....	12.70	12.10	11.40	.....
22.....	700	36.80	50.21	71.59	99.14	8.65	6.47	6.98	8.26
23.....	310	34.64	50.28	68.47	105.18	11.54	7.73	6.82	8.76
24.....	250	58.26	78.77	105.44	.....	14.56	13.12	11.07	.....
25.....	100	47.14	66.59	90.10	114.39	11.78	11.09	10.60	10.89
26.....	110	54.82	78.62	112.56	129.52	15.66	10.23	11.25	11.20
27.....	53	49.74	88.04	118.88	.....	12.40	12.60	11.88	.....
28.....	500	23.13	36.88	61.07	.....	5.18	6.14	6.10	.....
29.....	1,200	42.29	56.40	76.83	.....	10.50	7.50	6.90	.....
30.....	185	34.62	36.76	81.29	.....	7.70	5.00	7.20	.....
31.....	700	25.30	34.96	50.60	.....	7.20	5.80	4.80	.....
32.....	600	39.90	58.30	84.17	.....	7.98	7.00	8.00	.....
Totals.....	15,431								
and weighted averages.....		\$38.00	\$56.31	\$80.60	\$108.69	8.8c	7.7c	7.6c	9c

Because of the number of cattlemen's estimates entering into this study, some of which are vital in a final analysis, as, for instance, percentage of calf drop, mortality, and average annual gains, a question naturally arises as to the operator's ability to recall or to estimate closely enough for these compilations, and, as a logical consequence, the fairness of the deductions may be somewhat open to debate. Yet, if this report serves to show the need of keeping more accurate records, and, as well, points the way to the kind of information that can be gleaned from properly kept records, its publication may serve a useful purpose.

Notwithstanding the limitations of this particular study, the work, in my opinion, is of value as a study of general conditions, since the final result is fairly accurate. It also illustrates what can be done in the way of finding out costs from properly kept records.

FINDINGS

These thirty-two ranches possessed a total of 484,283 acres of land, varying from 1750 to 60,000 acres for the individual holding. In some instances, for various reasons, the range was not fully utilized, in others it was supplemented by grazing in national forests, or by other summer pasture. Seventeen of the thirty-two ranches each possessed an acreage in excess of 10,000 acres.

In numbers of stock cattle the herds totaled 15,431 cows and 833 bulls, the cow herds ranging from 53 to 1200, twelve herds being in excess of 500 head.

Native range was the outstanding feed, this alone serving on eleven ranches for calves, and on twenty ranches for yearlings. Thirteen cattlemen utilized supplementary feeds for their three-year-old cattle, especially in finishing for market. Four cattlemen utilized such feeds for their beef older than three years.

The average cost of producing a steer, based on the findings from these thirty-two ranches was as follows:

COSTS DURING THE FIRST YEAR—AVERAGE AGE 9 MONTHS

Feed	
Range	\$13.07
Supplementary	3.31
Labor	
Riders and manual	4.63
Management	2.54
Use of saddle horses	1.13
Use of autos and trucks .....	.86
Use of buildings .....	.96
Use of corrals .....	.66
Use of equipment .....	.27
Herd charge	8.66
Minor and miscellaneous charges	3.05
Gross cost per head	\$39.14
Less credits*	1.14
Net cost first year	\$38.00
Average weight, 433 pounds. Average cost per pound, 8.8 cents.	

* Hides, home-used meats, etc.

COST BY END OF SECOND YEAR—AVERAGE AGE 21 MONTHS

Net cost end of first year	\$38.00
<i>Costs incurred during second year:</i>	
Feed	
Range	\$6.29
Supplementary	1.58
Labor	
Riders and manual	2.66
Management	2.07
Use of saddle horses .....	.64
Use of autos and trucks .....	.55
Use of buildings .....	.53
Use of corrals .....	.40
Use of equipment .....	.14
Herd charge	2.30
Minor and miscellaneous charges	1.65
Gross cost second year	\$18.81
Less credits .....	.50
Net cost second year	\$18.31
Net cost first year	38.00
Total net costs first and second years	\$56.31

Average weight second year, 735 pounds.

Cost per pound end of second year, 7.7 cents.

COST BY END OF THIRD YEAR—AVERAGE AGE 33 MONTHS

Net cost end of second year	\$56.31
<i>Costs incurred during third year:</i>	
Feed	
Range	\$9.56
Supplementary	3.43
Labor	
Riders and manual	2.85
Management	1.46
Use of saddle horses .....	.64
Use of autos and trucks .....	.53
Use of buildings .....	.52
Use of corrals .....	.42
Use of equipment .....	.13
Herd charges	3.11
Minor and miscellaneous charges	1.64
Net cost third year (no credits)	\$24.29
Net cost first and second years	56.31
Net cost end of third year	\$80.60

Average weight end of third year, 1063 pounds.

Average cost per pound, 7.6 cents.

COST TO SELLING PERIOD, FOURTH YEAR—AVERAGE AGE 44 MONTHS

Net cost end of third year	\$80.60
<i>Costs incurred during fourth year:</i>	
Feed	
Range	\$8.71
Supplementary	8.36
Labor	
Riders and manual	2.63
Management .....	.91
Use of saddle horses .....	.53
Use of autos and trucks .....	.44
Use of buildings .....	.74
Use of corrals .....	.14
Use of equipment .....	.13
Herd charge	3.22
Minor and miscellaneous charges	2.28
Net cost during fourth year (no credits)	\$28.09
Net cost first three years	80.60
Total net cost fourth year	\$108.69

Average weight fourth year, 1202 pounds.

Cost per pound, 9c.

HANDLING OF CATTLE

Ages of Cattle.—The average ages of the different groups of young stock were found to be as follows:

End of first calendar year—average 9 months, range 6 to 12 months.

End of second calendar year—average 21 months.

End of third calendar year—average 33 months.

End of fourth calendar year—average 44 months.

Approximately one-third of the total calves were 9 months old by the end of the first calendar year. This amounted to twice as many calves as the next highest figure, e.g., 10 months.

Age of Marketing.—The earliest age of marketing was reported as being from 26 to 28 months. The longest time that cattle were held was given as being from 40 to 44 months. Cattle sold at the earlier dates were estimated to weigh from 1000 to 1100 pounds. The weight of the older cattle was placed at 1200 pounds. The average age of selling cattle came when they were 33 months old, and reported as weighing about 1000 pounds. This would seem to indicate that cattlemen as a whole realize that beef over three years of age can be produced at a profit only under unusual conditions.

Relation of Production Costs to Price.—The average cost per pound for a twenty-one months old beef animal was found to be 7.7 cents, while that of a three-year-old animal was 7.6 cents. The market price of steer beef during the year 1922 ran from 6 to 7 cents, the bulk of the sales being at figures between 6 and 6½ cents per pound, while a few cattle sold below 6 cents or above 7 cents. It is therefore evident that there is plenty of room for reduction of costs of production, or increase in price, if costs and receipts are to more nearly balance one another.

Breeds of Cattle.—The following breeds were represented on these various ranches: Shorthorns, Herefords, and Angus. Twelve ranches reported their breeding stock as Herefords, nine as Shorthorns, or else a cross of Shorthorns and Herefords, and two as Angus.

Period of Breeding.—Most of the breeding took place during spring and summer—fifteen ranches so reporting. Nine reported spring breeding, five all year, and three summer breeding.

Calf Drop.—Wide variation was found in percentages of calf drop, running from a low of 50 per cent on rough, bushy ranges, to 90 per cent under the more favorable conditions of feed and stock, with an

average for the thirty-two ranches of 67.3 per cent. The higher percentages usually hold for small ranches where breeding fields are small, and much individual attention is given to stock cattle.

Weaning.—Weaning took place either during the late summer months or the early fall months, the more general time being September, October, and November, with occasionally some weaning accomplished as early as July and August or as late as December.

Branding and Altering.—The months of April and May were figured as the time for branding and altering, occasionally some summer work was done, and a few ranches practiced branding and altering twice a year, once in the spring and once in the fall. Of the thirty-two ranches twenty-one did the branding and altering during either April, May, or June, even though they might follow with a second round-up during the fall.

Age of Discarding Cows.—The age of cows discarded as breeding stock ranged from a low of three years of calving to a high of fifteen years. One ranch reported that their cows were discarded anywhere after three to ten calves, while another estimate placed the serviceable age of cows at ten to fifteen years. The bulk of discarding, however, was reported as taking place between the ages of seven and ten years.

Average Value per Head.—The average value of herds of stock cows ranged from a low of \$30 to a high of \$75 per head. The stock cows in only three of the thirty-two ranches were valued at more than \$50. Six cattlemen valued their stock cattle at \$30, four at \$35, eleven at \$40, three at \$45, five at \$50, two at \$60, and one at \$75.

The bulls ranged in value from a low of \$50 to a high of \$350. Two valued their bulls under \$75, four at from \$75 to \$100, nineteen from \$100 to \$150 inclusive, and seven at from more than \$150 up to \$350.

The average value placed upon calves ranged from \$10 to \$30 inclusive. Four ranchers valued their calves at less than \$15 at the end of the first calendar year, ten at from \$15 to \$19 inclusive, nine at from \$20 to \$24 inclusive, and eight at from \$25 to \$30 inclusive.

The value of yearlings was placed at from a low of \$20 to a high of \$50 at the end of the second calendar year of the youngsters' growth. Four cattlemen valued this group of cattle at less than \$25, fifteen at from \$25 to \$34 inclusive, eleven at from \$35 to \$44 inclusive, and two at \$50.

The average value per head for two-year-olds ranged from a low of \$30 to a high of \$70 (for steers). Heifers, when a distinction between steers and heifers was made, were rated at \$10 a head less than steers.

The average for cattle carried to the end of the third calendar year, e.g. long twos, were mostly valued from \$45 to \$55, one operator valued this class of cattle at less than \$35, sixteen at from \$35 to \$44 inclusive, ten at from \$45 to \$54 inclusive, and three at from \$55 to \$64 inclusive.

For the aged beef cattle, values were placed at from \$40 to \$54 inclusive by eight operators, and at from \$55 to \$66 inclusive by six operators.

Gains.—Weights of calves at the end of the calendar year in which they were born averaged 433 pounds, although a spread was reported by the thirty-two cattlemen of from 300 to 550 pounds. Four cattlemen reported weights of from 300 to 400 pounds, twenty-one of from 400 to 500 pounds, and seven of 500 pounds or more.

Weights of cattle sold during the fourth year by twelve cattlemen holding beef to this age averaged 1202 pounds, and ranged from 1050 to 1250 pounds.

Number of Bulls Used.—Cattlemen reported using from as few as one bull to 40 cows to as high as one bull to 16 cows. The average was one bull to 22 cows, the majority of operators using either four or five bulls per 100 cows.

Mortality.—Cattlemen's estimates of the mortality of stock cows ranged from a low of $\frac{1}{2}$ of 1 per cent to a high of $7\frac{1}{2}$ per cent. The average was close to 3 per cent, most men reporting their losses at from 2 to 3 per cent, although enough heifers were usually retained each year to offset the mortality loss.

Three ranches reported no death loss among their bulls. The lowest reported loss amounted to $\frac{1}{2}$ of 1 per cent, the highest figure was 20 per cent. The average amounted to 3.6 per cent, with most cattlemen figuring their mortality of bulls as being between 1 and 2 per cent.

Calf mortality ranged from a low of $\frac{3}{4}$ of 1 per cent (one man reporting no loss) to a high of 8 per cent. The average for the thirty-two ranches amounted to 3.23 per cent with most of the ranches reporting a mortality loss of 4 to 5 per cent.

Mortality of youngsters during the second year ranged from $\frac{1}{2}$ of 1 per cent to 7 per cent. Here again one operator reported no mortality. Average mortality amounted to 2 per cent, with most of the figures standing at from 1 to 2 per cent.

Mortality during the third calendar year (e.g., period from 21 to 33 months), ranged from $\frac{1}{2}$ of 1 per cent to 5 per cent, with

two operators reporting no mortality. The average for all reports amounted to 1.4 per cent, with most of the men reporting from 1 to 2 per cent.

Mortality of mature beef cattle ranged from a low of $\frac{1}{4}$ of 1 per cent to a high of 5 per cent, with an average of 1.3 per cent. Most operators reported mortality for this group at less than 1 per cent, e.g., either $\frac{1}{4}$ or $\frac{1}{2}$ of 1 per cent.

Influence of Methods upon Costs.—Although the number of records in certain of the groups are too few in number to permit drawing final conclusions, yet they show a difference in costs traceable to different methods of raising cattle.

The average for each group is given below. Too few records are available for cattle beyond the third year—hence aged steers are ignored in tabulating these particular data.

Method of feeding	Number of records in each group	Percentage of calf drop	First year		Second year		Third year	
			Aver. weight end of year, lbs.	Aver. cost per lb.	Aver. weight end of year, lbs.	Aver. cost per lb.	Aver. weight end of year, lbs.	Aver. cost per lb.
Range.....	15	70	477	8.7c	792	8.1c	1,076	7.6c
Range and a little supplementary feed.....	6	67	450	10.0	683	8.9	975	8.4
Range and generous use of hay in winter.....	6	73	381	12.8	671	10.2	990	9.6
Range: with beef cattle finished on beet tops, hay, barley or similar feeds.....	5	71	430	7.7	705	6.3	1,075	6.5

UNIT FACTORS

To provide a means of measuring the cost of producing beef, as long as practice remains similar to that in use at the time this study was made, a table of unit factors is appended below. By "unit factors" are meant basic items making up complete cost measured in terms of time and quantity rather than in dollars and cents.

The unit factors are made up from the following basic data:

Number of ranches	32
Gross acreage	484,283
Numbers of cattle:	
Stock cows	15,431
Bulls	833
Calves	10,703
Yearlings	10,007
Twos	9,850
Threes or older	1,651

TABLE SHOWING UNIT FACTORS PER HEAD PER YEAR INVOLVED IN RAISING
BEEF CATTLE

	Age of Cattle—Years			
	First year	Second Year	Third year	Fourth year
Home ranch—acres.....	20	6½	10	7
Riders and manual labor:				
Average hours.....	12	7	7	7
Management, average hours.....	4	2¼	2¼	1½
Use of horses, hours.....	19.2	11.3	12.6	13.8
Use of autos and trucks, miles.....	9.5	5.9	6.6	5.1
Cost of supplementary feeds.....	\$3.87	\$1.50	\$2.44	\$2.98
Use of buildings.....	.96	.53	.52	.74
Use of corrals and improvements.....	.66	.40	.42	.14
Use of equipment.....	.27	.14	.13	.13
Herd charge.....	8.66	2.30	3.11	3.22
Miscellaneous charges.....	3.05	1.65	1.64	2.20
Credits.....	1.14	.50		
Average weights end of year, in pounds.	433	735	1,063	1,202

In addition to the home range, eleven ranches utilized other pastures (e.g., grazing in National Forest Reserves), while twenty cattlemen fed supplementary feeds.

On the basis of home range data, a cow and her calf annually require approximately three times the feed necessary to carry a yearling and twice the feed needed for a two-year-old. Similarly a yearling requires approximately 65 per cent of the feed necessary for a two-year-old. This deduction assumes that the feed is of equal quality for all cattle. In actual practice beef animals are commonly given preference over stock cattle in allotting the better feed, so that the spread in acreage needs doubtless is partly traceable to the fact that the cows are obliged to utilize the less desirable feeds.

For the unit factors shown above, the costs obtained by this survey were as follows:

Riders and manual labor, cost per hour averaged	38.7c
Management per hour averaged	70.0c
Saddle horses, average cost per hour	52.0c
Automobiles and trucks, average cost per mile of use	8.5c

The average amounts of investment per head of the different groups of cattle were as follows:

Stock cows	\$41.87
Stock bulls	139.48
Calves	19.35
Yearlings	29.23
Two-year-olds	43.43
Three-year-olds	51.46

SUGGESTIONS

Costs per Pound.—In connection with the collection of cost data an effort was made to obtain suggestions from operators and field men indicating ways in which profits might be increased. The field work was further augmented by a study of the data tables as presented in the foregoing parts of this report. Obviously all forthcoming recommendations are not applicable to every ranch, yet it is believed that all operators can find something of value in the discussion. One of the outstanding results is a possibility of increasing profits by selling at a time when costs are at the lowest stage. The findings illustrating this point are shown below.

The figures of actual costs were:

End of	Cost per head	Cost per pound
First year	\$38.00	8.8c
Second year	56.31	7.7c
Third year	80.60	7.6c
After third year	108.69	9.0c

Considering cumulative costs only, it is wise to dispose of all beef before the beginning of the fourth year. Considering the selling price, the wider the spread between the cost and the selling price (when the latter is higher than the former) the more profit is obtainable by selling rather than by holding, provided the capacity of the range be fully utilized. This is discussed more in detail on page 21.

Economizing in Feed and Labor.—An idea of the relative importance of the various items entering into the cost of producing beef can be gained by noting the percentages of (1) feed, (2) labor, (3) use of horses, autos, trucks, (4) use of buildings, corrals and equipment, (5) herd charge, (6) minor and miscellaneous charges. These data are set forth immediately below:

Group	Cost per head in dollars				Percentage of each item			
	First	Second	Third	Fourth	First	Second	Third	Fourth
Feed.....	\$16.38	\$7.87	\$12.99	\$17.07	41%	42%	53%	60%
Labor.....	7.17	4.73	4.31	3.54	18	25	18	13
Use of horses, autos and trucks.....	1.99	1.19	1.17	.97	5	6	5	3
Use of buildings, corrals and equip- ment.....	1.89	1.07	1.07	1.01	5	6	4	4
Herd charge.....	8.66	2.30	3.11	3.22	22	12	13	12
Minor and miscel- laneous.....	3.05	1.65	1.64	2.28	9	9	7	8
	\$39.14	\$18.81	\$24.29	\$28.09	100	100	100	100
Credits.....	1.14	.50						
Net cost.....	\$38.00	\$18.31	\$24.29	\$28.09				

Fortunately economy in feed and labor is easier to accomplish than reduction in fixed charges for use of buildings, corrals, horses, and in herd charges, taxes, insurance and similar items. Feed and labor (including management) constitute 59 per cent of the cost of raising a calf to the end of the first calendar year, while 67 per cent, 71 per cent and 73 per cent respectively are involved in the subsequent second, third and fourth years. Attention to economic and efficient use of feeds and labor offers a means of possible increase in profits.

In this connection it is noteworthy that the feed cost mounts in a substantial amount for animals kept beyond the third year. Full utilization of feed is essential. In this study the average acreage per head varied as follows:

Age of cattle	Variations in number of acres allotted per head
First year	4.5 to 46.1 acres per head
Second year	3.1 to 16.7 acres per head
Third year	2.4 to 21.7 acres per head
Fourth year	3.1 to 17.2 acres per head

Improving the range may be a means of materially lowering production costs. This may be accomplished in several ways. Large fields can be cut up by fences to permit the fullest use of all grass. Where fencing is not practicable, cattle may be brought to graze over more range by judicious selection of salting places, and by the development of watering places, so that cattle will not be required to travel unreasonably long distances to water. Troughs at springs are preferable to mud-holes.

Fewer cattle of better quality help to increase profits, for they gain weight faster and mature earlier than do the inferior kinds.

Rotation grazing and reseeding of overgrazed pastures are suggested as means of getting the fullest use of the pasture. Rotation grazing permits natural reseeding with a resulting possible increase of feed greater in quantity than can be gained by continually grazing.

It is prudent to provide sufficient reserves of hay, straw or pasture for seasons when natural feed is short so as to avoid most of the heavy losses that come every few years to the unprepared and force the shipping out of cattle to other grazing, purchase of expensive feed, or else require the facing of losses from starvation.

Variable conditions under which cattle are handled and differing ideas of cattlemen as to what constitutes satisfactory handling means that the cost per animal may vary over rather wide extremes. Yet when one sets up the average cost per animal, an idea intrudes that perhaps some cattlemen are using too much labor for economic beef

production, while, conversely, a few may be utilizing too little. This comment arises after studying the individual costs on the 32 ranches under study. The summarized findings in this connection show the following:

USE OF RIDERS AND MANUAL LABOR

Number of Hours per Head per Year for Different Classes of Cattle

Age of cattle	Variation in hours	Average hours
First year	5.2 to 34.6	12
Second year	2.9 to 25.0	7
Third year	2.9 to 24.8	7
Fourth year	2.3 to 18.0	7

The cost in money varied through wide extremes, this variation compared with the group averages is shown below:

COST OF LABOR PER HEAD PER YEAR FOR DIFFERENT CLASSES OF CATTLE

Age of cattle	Variation in cost	Average cost
First year	\$1.48 to \$15.10	\$4.63
Second year	1.08 to 10.88	2.66
Third year	1.03 to 8.36	2.85
Fourth year	1.07 to 6.65	2.63

Obviously economy is attained either by payment of a relatively low scale of wages, by a relatively large working day, or more efficient use of the men's time. The average cost per man hour at the time of making this survey amounted to 38.7 cents. Sometimes economy in man labor is attained by the providing of better equipment (e.g., saddle horses, corrals), by planning a definite feeding programme in advance of the season, or by better organization of the rider, fence, and other crews.

The same suggestion holds for management. The findings were:

MANAGEMENT CHARGES

Number of Hours Spent in Management per Head per Year for Different Classes of Cattle.

Age of cattle	Variation in hours	Average hours
First year	0.4 to 28.7	4
Second year	0.2 to 14.6	2¼
Third year	0.3 to 14.7	2¼
Fourth year	0.7 to 5.0	1½

The costs show similar wide variations:

COST OF MANAGEMENT IN MONEY PER HEAD PER YEAR FOR DIFFERENT
CLASSES OF CATTLE

Age of cattle	Variation in costs	Average charge
First year	\$.17 to \$16.50	\$2.54
Second year .....	.07 to 8.38	2.07
Third year .....	.17 to 9.24	1.47
Fourth year .....	.26 to 2.34	.91

The average charge for management based on the thirty-two ranches amounted to 70 cents per hour.

Economy in the Use of Horse Labor.—The possibility of more economic use of horse labor is suggested by a study of the following data:

VARIATION IN THE USE OF HORSES

Hours per Head per Year for Different Classes of Cattle

Age of cattle	Variation in hours	Average use in hours
First year	2.0 to 60.7	19.2
Second year	1.0 to 32.2	11.3
Third year	1.0 to 32.3	12.6
Fourth year	1.0 to 55.0	13.8

COST OF SADDLE HORSES PER HEAD PER YEAR FOR DIFFERENT CLASSES OF CATTLE

Age of cattle	Variation in costs	Average costs
First year	\$.14 to \$.704	\$1.13
Second year .....	.10 to 5.30	.64
Third year .....	.10 to 5.43	.64
Fourth year .....	.39 to 2.88	.53

The cost, averaged for the thirty-two ranches, amounted to 5.2 cents per hour of use.

As evidence that different conditions result in varying costs the following table has been prepared by reclassifying certain of the fifteen records covering cattle exclusively raised on the range into two classes, (1) those producing under unusually low costs due to such conditions as low pasture charge, cheap or very efficient use of labor and management, low building charge, high calf drop, low general expense, low herd depreciation, and (2) those facing unusually high costs traceable to conditions opposite to those just cited, with low calf drop, poor management, and high pasture charge as the outstanding items. Note the difference in costs.

Ranches reporting	Number of records	First year		Second year		Third year	
		Average weight	Aver. cost per lb.	Average weight	Aver. cost per lb.	Average weight	Aver. cost per lb.
Unusually high costs.....	4	475 lbs.	10.1c	751 lbs.	9.6c	1,075 lbs.	9.3c
Unusually low costs.....	3	492	6.7	742	6.2	1,050	5.6
Average for group....	15	477 lbs.	8.7c	792 lbs.	8.1c	1,076 lbs.	7.6c

Increasing the Percentage of Calf Drop.—The percentage of calf drop, a vital factor in the cattleman's business, may be measured in two ways: first, by reporting cattlemen's beliefs concerning the calf drop that they are getting, and, second, by comparing the calves reported in the course of the survey with the stock cattle. The former method has the disadvantage in that memory may recall the outstanding year (good or bad) or reflect a desire to make as good a showing as possible for the business. The comparison with the survey data does not permit a study of cows sold or cows taken in, and hence may not be an accurate index of the business. Yet the findings are interesting even though they cannot be considered as strictly accurate. They show a close correspondence between the estimated and the recorded calf drop.

Cattlemen's statements of their calf drop ranged from a low of 50 per cent to a high of 90 per cent and averaged for the thirty-two records 67.3 per cent.

A comparison of the data set forth in the tabulated records indicates 10,703 calves for 15,431 stock cattle, or an average drop of 69 per cent. Both the estimated and compared percentages of calf drop are sufficiently low to indicate the possibility of increasing profits by giving attention to this detail.

Reducing Mortality.—A certain percentage of death losses from various causes seems unavoidable. The tabulations of the survey data do not show how serious this factor may be, but cattlemen's estimates, called for as a part of the data accumulations, are instructive. Estimates of the thirty-two cattlemen contributing data have already been set forth in considerable detail, and suggest the desirability of reducing death losses when practical.

Improving the Sire Situation.—A noticeable point is the tendency among some ranchers to use bulls that are too high-priced for their performance value, depreciation of these bulls being a very large item, as much as several thousand dollars in some cases. On the whole, though, the average investment in bulls appeared to be low.

It may be practical to increase the calf drop in many cases such as by more use of young bulls, more bulls per hundred cows, maintaining cattle in better conditions at all times (through rotation grazing and lighter stocking), and closer culling out of poor cows and bulls.

Maintaining the Quality of Breeding Cows.—It is believed to be a mistake to breed heifers to calve at younger than 24 months, as these immature heifers are liable to skip the following year. Furthermore calf and cow mortality is reported to be much higher with the younger stuff. Calves, when being weaned, should be given the best pasture obtainable or fed for a month or two, in order to give them a good start in life. A stunted, weak calf is liable to die during the winter, and at any rate cannot make the gains possible with sturdy, well-grown animals.

Dehorning.—Many cattlemen think dehorning stock to be a good practice because of better prices obtainable at market time and a belief that dehorned animals are quieter and gain faster than horned ones.

Vaccination.—Vaccinating has saved many cattlemen from severe loss from disease and is recommended.

Size of Business.—It appears from the data that ranches running a small number of cows are at a disadvantage, in that overhead and operating costs are liable to be higher per head than where the operator runs large numbers. Any number below 300 appear to be at a disadvantage. This condition results in a cost per pound in excess of the 6 to 7 cents cost of producing beef on some of the larger ranches under efficient management, where the overhead and operating charges do not constitute too great a percentage of total cost.

Need of Better Bookkeeping.—This study was started with a belief that data would be obtained from cattlemen's books. Such did not prove to be the case. In fact, ignorance of many of the elements of their own business was rather general on the part of cattlemen. Judging from the data collected, this ignorance extends particularly to such items as (1) percentage of calf drop, (2) percentage of mortality in different classes of cattle, (3) average gains in weight from calf to yearling, yearling to two-year-old, and two-year-old to three-year-old, (4) inventories of equipment, especially as they relate to original costs and present values of buildings and fences. Cash income and outgo, labor costs, values of land, feed and cattle, and amounts of feeds utilized were pretty well known.

Our findings indicate that better bookkeeping (possibly upon some coöperative basis) is vital if cattlemen are to intelligently plan their activities and properly organize their business both in its relation to allied interests and as a unit within itself.

Early Selling.—The data indicate that holding beyond the third year is hardly justified. This is shown in the table immediately following:

End of Year	Average gain in weight during year	Cost per year	Av. cost per lb. of gain during year
First	433 lbs.	\$38.00	8.8c
Second	302 lbs.	18.31	6.1c
Third	330 lbs.	24.29	7.4c
Fourth	139 lbs.	28.09	20.2c

This table shows three other items: (1) If we ignore the first year's cost, which is necessarily high, because the cow cost is here assessed against the calf, each succeeding year results in an increasing cost of feeding a beef animal; (2) the gains in weight from the third to the fourth year are relatively small, resulting in a high cost per pound of gain; and (3) the cheapest gains were made during the second year of the life of the animal.

Brief Résumé.—The outstanding factors which should be considered in attempting to decrease the cost of producing beef cattle as shown by this study are:

1. Economy in using feed, by suitable fencing, judicious grazing, convenient watering places, and sometimes seeding of range.

2. Production of economical supplementary feeds when needed to increase the carrying capacity of the range.

3. Selection of relatively cheap feeds.

4. Economical use of man labor.

5. Discarding surplus horses.

6. Reduction of mortality.

7. Providing sufficient bulls to insure a satisfactory calf drop.

8. Maintaining good, yet not too expensive bulls.

9. Improvement of breeding cows.

10. Care to prevent breeding immature heifers.

11. Selling at an early age, because on an average the cheapest gains are made during the first two years. Gains made by cattle raised for beef after three years tend to be expensive gains.

12. Collection of data concerning percentages of (a) calf drop, (b) mortality, and (c) annual gains.

13. A better understanding of investment in land, buildings, equipment, and stock cattle, as a basis for determining costs of production.

The greatest results will accompany economy in use of feed, labor, and reduction of herd charges—these three constituting the largest single items entering into costs of production.

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